

REMARKS

Reconsideration of the application, as amended, is respectfully requested.

I. STATUS OF CLAIMS

Claims 1-13, 22 and 23 are pending in this application. Claims 1, 2 and 22 have been amended herewith to more particularly point out and distinctly claim that which applicants regard as their invention. Moreover, claim 6 has been cancelled without prejudice.

Support for the above amendments may be found throughout the specification as originally filed. It is respectfully submitted that no new matter has been added by virtue of this amendment.

II. 35 U.S.C. 102(e) REJECTIONS

Claims 1, 2, 4, 5, 7, 11, 12, 13, 22 and 23 have been rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,927,410 to Chen ("the Chen patent").

In response, it is submitted that the Chen patent fails to teach or suggest all of the features recited in claims 1 and 22.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. (See MPEP 2131; **Verdegaal Bros. v. Union Oil Co. of California**, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)).

Chen at the very least fails to teach or suggest the relationship between the heights and the surface areas of each of the phase change material layers as recited in claims 1 and 22. In particular, Chen at the very least fails to teach or suggest a multi-bit phase change memory cell (claim 1) or a multi-bit phase change memory (claim 22), wherein the height of each of the plurality of phase change layers increases along a direction from the first outer conductor layer to

the second outer conductive layer and the surface area of each of the plurality of phase change layers decreases along the direction from the first outer conductor layer to the second outer conductive layer, as recited in claims 1 and 22 of the presently claimed invention.

Although Chen describes that the thicknesses of the phase changing material layers 22 of its phase changing memory device may be different from one another, Chen is still completely silent regarding the specific relationship between the heights and the surface areas in forming the thicknesses of each of these phase changing material layers, as required by claims 1 and 22. Rather, Chen makes only a general statement without more that the thicknesses of its phase changing material layers may 22 be different from one another. (See Col. 4, lines 32-36 of **Chen**). However, the above general statement in Chen is not sufficient for teaching the specific relationship between the heights and surface areas of each of the plurality of phase changing material layers, as recited in claims 1 and 22 because there a wide variety of different ways to vary the thickness of the phase changing layers without having the heights of each of the phase change layers increase in one direction and the surface areas for each of the phase change layers decrease along that same direction of the memory cell.

Moreover, while Applicants do not concede that the statement by the Examiner in the Office Action that Chen describes the electrical resistance for each of the phase change material layers increases along a direction from a first outer conductive layer to a second outer conductive layer is even accurate, this statement still nevertheless does not show that Chen teaches the specific relationship between the heights and surface areas of each of the plurality of phase changing material layers, as recited in claims 1 and 22. Rather increasing electrical resistances in one direction may be achieved in several different ways without providing phase change material having the heights and surfaces provided in the manner recited in claims 1 and 22. (See page 10, lines 14- page 11, lines 1-4 of the present specification).

For at least the reasons set forth above, Chen clearly provides no guidance to one skilled in the art for arriving at the specific relationship between the heights and surface areas of each of the plurality of phase changing material layers, as recited in claims 1 and 22. Therefore, Chen at the very least fails to teach or suggest a multi-bit phase change memory cell (claim 1) or a multi-bit phase change memory (claim 22), wherein the height of each of the plurality of phase change

layers increases along a direction from the first outer conductor layer to the second outer conductive layer and the surface area of each of the plurality of phase change layers decreases along the direction from the first outer conductor layer to the second outer conductive layer, as recited in claims 1 and 22 of the presently claimed invention

Withdrawal of the rejection to claims 1 and 22 is respectfully requested. As claims 2-5, and 7-13 depend from and incorporate all of the limitations of claim 1 and claim 23 depends from and incorporates all of the limitations of claim 22, withdrawal of the rejection to these dependent claims is likewise requested.

III. 35 U.S.C. 103(a) REJECTIONS

- (i) Claims 3, 6, 9, and 10 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Chen as discussed above, in view of U.S. Patent No. 5,536,947 to Klersy et al. ("the Klersy patent").
- (ii) Claim 8 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Chen as discussed above, in view of U.S. Patent Application Publication No. 2004/0178401 to Ovshinsky et al. ("the Ovshinsky publication").

In response, it is submitted that the combination of Chen, Klersy and Ovshinsky fails to teach or suggest all of the features recited in claims 1 and 22.

To establish prima facie obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art. (See MPEP 2143.03; *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)).

As noted above with regard to claim 1, Chen at the very least fails to teach or suggest Chen at the very least fails to teach or suggest a multi-bit phase change memory cell, wherein the height of each of the plurality of phase change layers increases along a direction from the first outer conductor layer to the second outer conductive layer and the surface area of each of the plurality of phase change layers decreases along the direction from the first outer conductor layer

to the second outer conductive layer. As claims 3 and 8-10 depend from and incorporate all of the limitations of claim 1, these dependent claims are likewise patentable over the Chen reference.

Moreover, the Klersy and Ovshinsky references each fail to cure the above deficiency of the Chen patent. Although Klersy mentions compositional modifications which may include phase change material layers of differing thicknesses, Klersy still fails to teach or suggest the specific relationship between the heights and the surface areas in forming the thicknesses of each of these phase changing material layers, as required by claim 1. Klersy only makes a general statement without more that the thicknesses of its phase changing material layers be different from one another, but Chen clearly provides no guidance to one skilled in the art for arriving at the specific relationship between the heights and surface areas of each of the plurality of phase changing material layers, as recited in claim 1. (See Col. 14, lines 33-34 of Klersy).

As with Chen, Klersy and Ovshinsky are likewise each completely silent regarding a multi-bit phase change memory cell, wherein the height of each of the plurality of phase change layers increases along a direction from the first outer conductor layer to the second outer conductive layer and the surface area of each of the plurality of phase change layers decreases along the direction from the first outer conductor layer to the second outer conductive layer.

Thus, the combination of Chen, Klersy and Ovshinsky at the very least fails to teach or suggest all of the features of claims 3 and 8-10.

Withdrawal of the rejection to claims 3 and 8-10 is therefore requested.

IV. CONCLUSION:

In summary, applicants respectfully submit that the instant application is in condition for allowance. Early notice to that end is earnestly solicited.

Appl. No. 10/718,070
Art Unit: 1765

If a telephone conference would be of assistance in furthering prosecution of the subject application, applicant requests that the undersigned be contacted at the number below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Scott L. Appelbaum', written over a horizontal line.

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